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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of: Jim A. Larson et al.  
Title: POINTING DEVICE WITH INTEGRATED AUDIO INPUT  
Attorney Docket No.: 884.078US1

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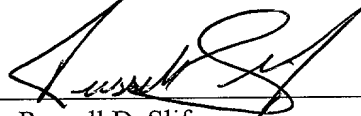
- X Utility Patent Application under 37 CFR § 1.53(b) comprising:  
X Specification ( 11 pgs, including claims numbered 1 through 15 and a 1 page Abstract).  
X Formal Drawing(s) ( 2 sheets).  
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X Check in the amount of \$838.00 to pay the filing fee.  
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12/15/98 10617 U.S. PTO

**Pointing Device with Integrated Audio Input**

5                   Technical Field of the Invention

The present invention relates generally to input devices and in particular the present invention relates to pointer type input devices used with touch sensitive processing devices.

10                   Background of the Invention

Advancements in processing power have enabled the design and manufacture of processing devices which deviate from a traditional input device such as a keyboard. For example, hardware and software have been developed which allow a user to control a computer using normal speech. The user is also capable of dictating information to be  
15 stored in memory provided with the computer. Presently, however, accurate speech input must be provided to allow the processor to accurately translate the speech into computer readable data. As such, it is desired to locate a microphone close to the user such that background noise is minimized. Present systems, therefore, require that the user wear a headset to position the microphone close to the user's mouth. The  
20 processing power required to perform speech recognition, combined with the requirement for high-quality speech input, dictates that a user operate a traditional stationary personal computer.

Mobile personal computing devices, such as lap-top computers and personal digital assistant (PDA) devices, are available with touch screens as input devices.

25 These touch screens allow a user to touch locations on the display screen to indicate desired input. This type of input allows manufacturers to simplify the interface between the user and the processor, while still providing flexibility to adapt to changes in software executed by the processor.

For the reasons stated above, and for other reasons stated below which will  
30 become apparent to those skilled in the art upon reading and understanding the present

specification, there is a need in the art for a mobile personal computing device which allows a user to enter information using both a touch screen and voice commands.

### Summary of the Invention

5           A computer input stylus comprising a housing having a first end and an opposite second end, a microphone located at the second end for receiving voice signals, a transmitter located in the housing for transmitting the voice signals received by the microphone to an external device, and a switch circuit for activating the transmitter.

          In another embodiment, a personal digital assistant (PDA) system comprises a  
10   mobile personal digital assistant having a touch screen display for producing input signals in response to physical contact, and an input stylus. The stylus comprises a housing having a first end and an opposite second end, a microphone located at the second end for receiving voice signals, a transmitter located in the housing for transmitting the voice signals received by the microphone to the mobile personal digital  
15   assistant, and a switch circuit for activating the transmitter.

          A method of inputting data to a personal digital assistant (PDA) is described in another embodiment. The method comprises receiving input voice signals with a microphone located in a hand-held stylus, transmitting the input voice signals from the hand-held stylus to the personal digital assistant, and translating the received input  
20   voice signals into computer readable data and storing the computer readable data in the personal digital assistant.

### Brief Description of the Drawings

          Figure 1 is illustrates a personal computing device having a touch screen;  
25           Figure 2 illustrates a pointing device for use with the personal computing device of Figure 1;  
          Figure 3 is a block diagram of a circuitry of the pointing device of Figure 2;  
          Figure 4 illustrates one embodiment of a processing system;  
          Figure 5 illustrates another embodiment of a processing system; and  
30           Figure 6 illustrates another embodiment of a processing system.

### Detailed Description of the Invention

In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific preferred embodiments in which the inventions may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that logical, mechanical and electrical changes may be made without departing from the spirit and scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims.

Referring to Figure 1, a personal digital assistant (PDA) having a touch screen is described. The PDA 100 is designed to be portable and allow a user to store and recall information. The computing device includes a touch screen 102, keypad inputs 104, and optional microphone 106. The touch screen can be controlled using a pointing device, or stylus 110. In one embodiment, the stylus includes a microphone 120 receiving acoustical voice commands which are used to input data and/or control the PDA. It will be appreciated that the personal digital assistant is typically used in a manner which positions the PDA approximately 12 to 18 inches away from a user's mouth. As such, optional microphone 106 is susceptible to background noise. To reduce the effects of background noise, a microphone is provided in the stylus as described in greater detail below. As illustrated in Figure 1, the stylus can be tethered to the PDA via a wire 109 such that the wire is used for wired communication between the stylus and the PDA. This wire is optional, such that in another embodiment the stylus communicates via wireless transmissions. The voice signals received by the stylus are typically translated and displayed on the touch screen. The translated data is stored in the PDA such that the user can retrieve the information and view the stored data. The term "personal digital assistant" is used herein to define any mobile processor intended to store and communicate information for use by a user. This information is typically personal in nature, such as addresses, notes, schedules and the

like. The PDA can include lap top computers with a touch screen. The PDA can also include communication circuitry for bi-directional communication with external devices, such as fax machines, and networked computers. Thus, PDA's are not limited to data storage and display devices.

5           One embodiment of a pointing stylus is illustrated in Figure 2. Stylus 110 includes a first end 112 having a point, and an opposite end 114 which includes a microphone 120. The stylus is not limited to having a pointed end, the end can be, but is not limited to, round, flat or bulbous. The stylus includes a housing 122 which houses an electronic transmitter circuit. An activation switch 124 is provided to allow a  
10   user to selectively activate the microphone and transmitter circuits. The stylus is intended to be hand-held and used in a manner similar to a pen. The stylus, however, is used to selectively touch screen 102 of the personal digital assistant to provide input. It will be appreciated that the stylus allows a user to position the microphone close to their mouth to increase the quality of voice signals, while reducing the effect of background  
15   noise.

          One embodiment of above circuitry provided in stylus 110 is illustrated in the block diagram of Figure 3. The circuitry includes microphone 120, a power source 130, switch 124, and a transmitter circuit 132. The transmitter circuit can be configured to either transmit information to the personal digital assistant through a wire, or transmit  
20   voice data via a wireless communications signal. If the wired embodiment is desired, power source 130 can be located in the PDA to reduce circuitry located in the stylus. In the wireless embodiment, however, the power source 130 is preferably a battery stored within the housing of the stylus. Switch 124 is used to activate the microphone and transmitter circuits to allow voice signals to be transmitted to the receiving processor.  
25   As such, the switch is typically located along the housing of the stylus such that it is easily activated by a finger of the user. The stylus can be configured to transmit electronic voice signals only while the switch is activated. Alternatively, the stylus can transmit a voice signals in response to a single activation of the switch. In this embodiment, the transmitter of the stylus ends the transmission when input voice  
30   signals are not detected for a predefined time period. In yet another embodiment, the

switch is used to both activate the transmitter to start voice signal transmissions, and deactivate the transmitter to end transmissions of voice signals.

Referring to Figure 4, different operational embodiments are described of a voice controlled system using the above described stylus. In the first embodiment, the stylus communicates electronic voice signals with a personal computer 200 and directly with PDA 100 via a touch screen. The personal computer (PC) is a home or a business computer intended for stationery use. The personal computer includes a wireless receiver for receiving wireless transmissions from the stylus. Voice signals received by the personal computer are translated into computer recognizable or readable data. While the voice signals received by the personal computer can be used by the personal computer to perform more processing or other operations, it is intended, in the present system, that the personal computer transmits translated voice information to the personal digital assistant 100 via wireless communication. As such, a user operating the personal digital assistant 100 activates touch screen 102 using stylus 110 and speaks into the microphone 120. The voice signals are transmitted from the stylus to personal computer 200 where the voice signals are translated into data. The data is then transmitted from the personal computer to the personal digital assistant. It will be appreciated that the physical distance between the user and the personal computer is limited by the transmission power of the stylus transmitter 132, the PDA and the personal computer. This embodiment allows mobility of the user while maintaining the processing power of the personal computer for voice recognition.

In a second embodiment shown in Figure 5, stylus 110 transmits voice data to personal digital assistant 100. The personal digital assistant transmits the received voice data to personal computer 200. The personal computer then translates the received voice signals into data, and transmits the translated data back to the personal digital assistant. This embodiment allows for a more powerful transmitter to be used between the personal computer and the personal digital assistant, than may be available with transmitter 132. In either the first or second embodiment, when the personal digital assistant is located geographically away from the personal computer such that communication between them is not possible, the personal digital assistant receives

5 This option allows a user to use voice commands regardless of location relative to the personal computer. If the user retrieves the voice signals prior to translation, the personal digital assistant will play the stored signals instead of displaying translated data on the screen. Figure 6 illustrates an embodiment where the stylus communicates with the PDA and the PDA performs the speech recognition operations. This  
10 embodiment allows the stylus to communicate, in either a wireless or wired manner, with the PDA.

A mobile personal digital assistant has been described which allows a user to enter information using both a touch screen and voice commands. A stylus has been described which includes a microphone positioned at one end, and a transmitter for transmitting received voice signals to either a processor or the personal digital assistant. The wireless stylus also includes a power supply and an activation control switch. The processor can be used to translate the voice signals into computer recognizable data which is transmitted to the personal digital assistant for storage and display. If the user and the personal digital assistant are located remotely from the receiving processor, voice signals are stored in the personal digital system until a later time when the processor can translate the received voice signals. This application is intended to cover any adaptations or variations of the present invention. For example, the personal digital assistant may be adapted with a processor and software sufficient to translate received voice signals such that the personal computer is not necessary. As such, the stylus transmits directly to the PDA and the PDA translates received voice signals.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiment shown. Therefore, it is manifestly intended that this invention be limited only by the  
30 claims and the equivalents thereof.

What is claimed is:

1. An input stylus comprising:
  - a housing having a first end and an opposite second end;
  - a microphone located at the second end for receiving acoustical voice signals;
  - 5 a transmitter located in the housing for transmitting electronic voice signals received by the microphone to an external device; and
  - a switch circuit for activating the transmitter.
2. The input stylus of claim 1 further comprising a power supply located within  
10 the housing.
3. The input stylus of claim 1 wherein the transmitter transmits the electronic voice signals via either wireless or wired communication.
- 15 4. A personal digital assistant (PDA) system comprising:
  - a mobile personal digital assistant having a touch screen display for producing input signals in response to physical contact; and
  - an input stylus comprising:
    - a housing having a first end for providing physical contact with the touch  
20 screen, and an opposite second end;
    - a microphone located at the second end for receiving acoustical voice signals;
    - a transmitter located in the housing for transmitting electronic voice signals received by the microphone to the mobile personal digital assistant; and
    - a switch circuit for activating the transmitter.
- 25 5. The personal digital assistant system of claim 4 wherein the mobile personal digital assistant is electrically connected via one or more wires to the input stylus for receiving transmitted voice signals.



6. The personal digital assistant system of claim 4 wherein the mobile personal digital assistant has a receiver for receiving transmitted voice signals from the input stylus via wireless communication.

5 7. The personal digital assistant system of claim 4 wherein the input stylus further comprises a power supply located within the housing.

8. A processing system comprising:

10 a computer processor comprising voice translation software for instructing the computer processor to translate voice signals into machine readable data, the computer processor further comprising a transmitter for transmitting translated voice data;

a personal digital assistant (PDA) having a touch screen display for producing input signals in response to physical contact, the PDA further comprising a receiver for receiving the transmitted translated voice data from the computer processor; and

15 an input stylus comprising:

a housing having a first end for providing physical contact with the touch screen and an opposite second end;

a microphone located at the second end for receiving acoustical voice signals;

20 a transmitter located in the housing for transmitting electronic voice signals received by the microphone to either the computer processor or the personal digital assistant; and

a switch circuit for activating the transmitter.

25 9. The processing system of claim 8 wherein the input stylus transmits the voice signals to the computer processor via wireless communication, and the computer processor transmits translated voice signal data to the personal digital assistant.

10. The processing system of claim 8 wherein the input stylus transmits voice signals to the PDA, via a wireless communication and wherein the PDA and the computer processor are configured for bi-directional data communication.

5 11. The processing system of claim 8 wherein the stylus and the PDA are electrically connected using at least one wire.

12. A method of inputting data to a personal digital assistant (PDA), the method comprising:

10 receiving input voice signals with a microphone located in a hand-held stylus; transmitting the voice signals from the hand-held stylus to the personal digital assistant; and

translating the received input voice signals into computer readable data and storing the computer readable data in the personal digital assistant.

15

13. The method of claim 12 wherein translating the voice signals comprises:

receiving the input voice signals transmitted from the hand-held stylus with a personal computer;

translating the input voice signals with the personal computer; and

20

transmitting the translated input voice signals from the personal computer to the personal digital assistant.

14. The method of claim 12 wherein translating the received voice signals comprises:

25 receiving the input voice signals from the hand-held stylus with the personal digital assistant;

transmitting the input voice signals from the personal digital assistant to a personal computer;

translating the input voice signals with the personal computer; and

transmitting the translated input voice signals from the personal computer to the personal digital assistant.

15. The method of claim 12 wherein translating the received input voice signals is  
5 performed with the personal digital assistant.

855121-01-0000

### Abstract of the Disclosure

A mobile personal digital assistant (PDA) allows a user to enter information using both a touch screen and voice commands with a stylus. The stylus includes a microphone positioned at one end, and a transmitter for transmitting received voice signals to either a processor or the personal digital assistant. A wireless stylus also includes a power supply and an activation control switch. The processor is used to translate the voice signals into computer recognizable data which is transmitted to the personal digital assistant for storage and display. If the user and the personal digital assistant are located remotely from the receiving processor, voice signals are stored in the personal digital system until the later time when the processor can translate the received voice signals. Where the personal digital is adapted with a processor to translate received voice signals, the stylus transmits directly to the PDA and the PDA translates the received voice signals.

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**Date of Deposit:** December 15, 1998

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**Printed Name** Chris Hammond

**Signature** Chris Hammond

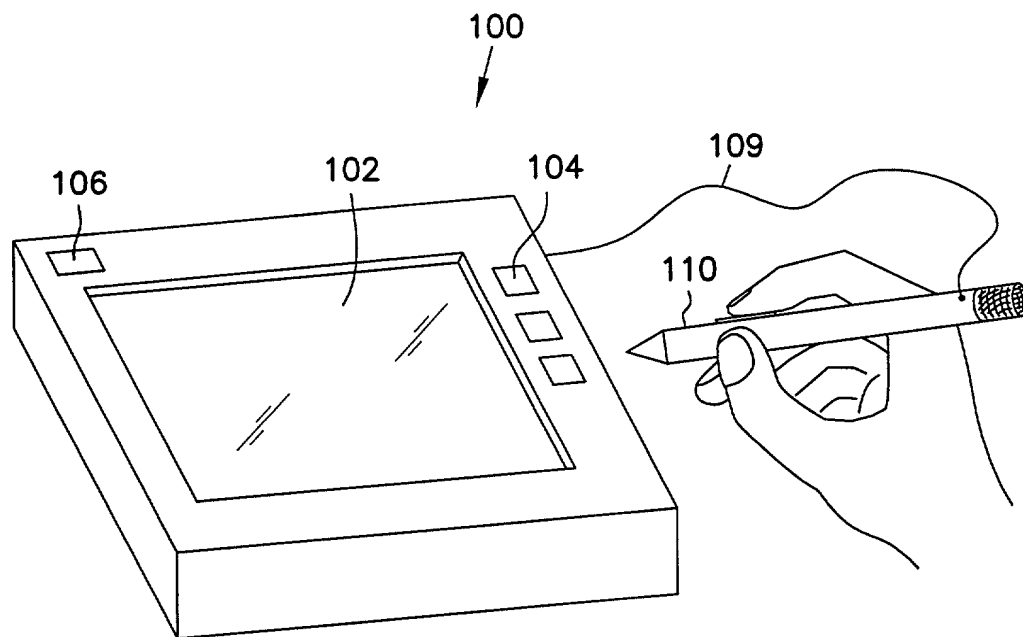


FIG. 1

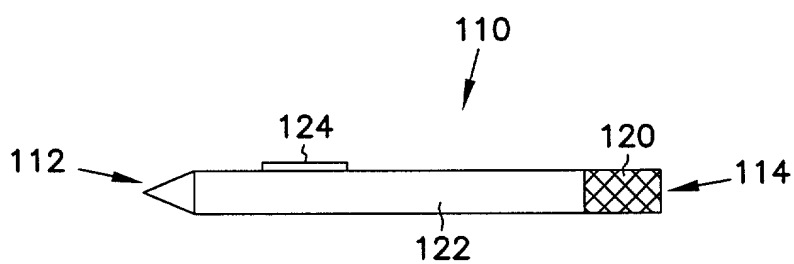


FIG. 2

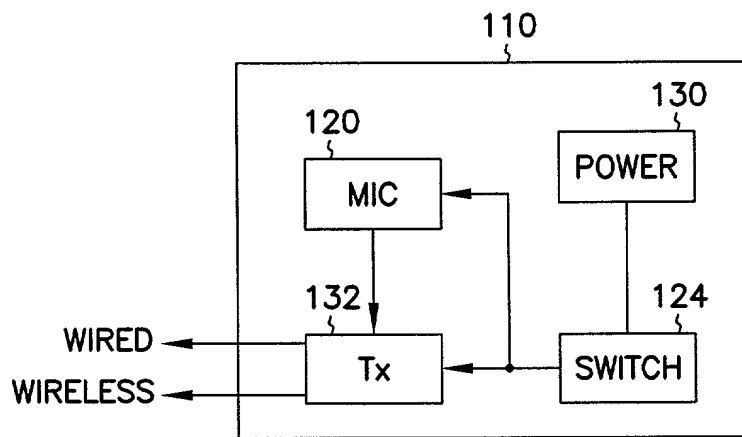


FIG. 3

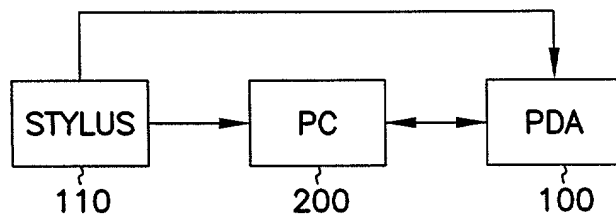


FIG. 4

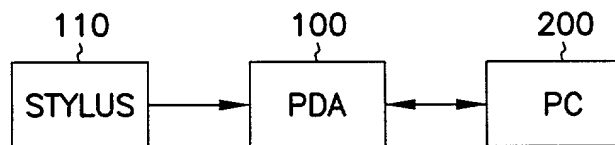


FIG. 5

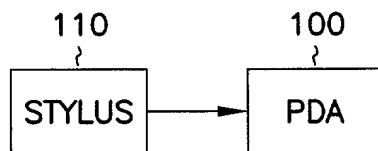


FIG. 6

# United States Patent Application

## COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **POINTING DEVICE WITH INTEGRATED AUDIO INPUT**.

The specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (see page 3 attached hereto).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

**No such applications have been filed.**

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

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I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

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I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

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Embretson, Janet E.	Reg. No. 39,665	Lemaire, Charles A.	Reg. No. 36,198	Woessner, Warren D.	Reg. No. 30,440
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Telephone No. (612)373-6900

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Ben S. Wymore

Full Name of inventor:  
Citizenship: Residence:  
Post Office Address:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Full Name of inventor:  
Citizenship: Residence:  
Post Office Address:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
  - (i) Opposing an argument of unpatentability relied on by the Office, or
  - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.